

In the Claims

Applicants are submitting a new complete claim set showing marked up claims with insertions indicated by underlining and deletions indicated by strikeouts and/or double bracketing.

Please cancel claims 69-72 without prejudice or disclaimer.

Please amend pending claims 5, 39 and 61, as noted below.

1. (Canceled)

2. (Previously Presented) The liquid dispenser as recited in claim 39 further comprising manually operable apparatus attached to the dispensing head for attaching the dispensing head to the housing at a point spaced vertically above the slideways.

3. (Previously Presented) The liquid dispenser as recited in claim 2, wherein the apparatus for attaching the dispensing head comprises:

- a plurality of threaded shafts mounted to the dispensing head;
- a plate disposed within the housing;
- cutouts on the plate for receiving the threaded shafts; and
- a knob threadably mounted on each threaded shaft, said knobs being rotatable about the shaft to be screwed into engagement with said plate for securing said dispensing head to the plate.

4. (Previously Presented) The liquid dispenser as recited in claim 39 further comprising:

- a plurality of tips, each tip being associated with one of the chambers, each tip having a first end with an enlarged opening, and a second end having a smaller opening than the opening of the first end, the first end of each tip being in fluid communication with an opening of an associated chamber; and

- a flexible seal extending around each chamber opening and being engaged by the first ends of the tips to provide a substantially air and liquid-tight seal between the first ends of the tips, and the associated openings of the chambers.

5. (Currently Amended) The liquid dispenser as recited in claim 4, wherein the seal comprises a layer which covers substantially all space between adjacent ~~ones of the~~ openings of the chambers.

6. (Original) The liquid dispenser as recited in claim 4, wherein the seal is formed of silicone.

7. (Original) The liquid dispenser as recited in claim 4 wherein the tips are carried in a tray, the liquid dispenser further comprising:

a clamp for clamping the tray against a wall of the housing; and
apparatus urging the clamp against the wall of the housing for maintaining a clamping force on the tray against the housing wall.

8. (Previously Presented) The liquid dispenser as recited in claim 7, wherein the urging apparatus comprises at least one spring.

9. (Previously Presented) The liquid dispenser as recited in claim 7, wherein the clamp is engageable by the apparatus for moving each piston within its associated chamber to move the clamp away from the wall of the housing against the clamping force of the urging apparatus to release the clamping force on the tray.

10. (Previously Presented) The liquid dispenser as recited in claim 39 wherein said apparatus for moving each piston within its associated chamber comprises:

a plate coupled to each of said pistons; and
a motor operably coupled to the plate for moving the plate toward and away from the chambers to cause movement of said pistons within the chambers.

11. (Previously Presented) The liquid dispenser as recited in claim 10 further comprising:

a tray containing a plurality of tips, each tip including a first end having an enlarged opening and a second end having an opening smaller than the opening of the first end;

at least one bracket being mounted on the housing and being movable with respect to the housing for clamping the tray against the housing so that the first end of each tip is in fluid communication with one of said chambers; and

a connection between the plate and the bracket for moving the bracket away from the housing in response to movement of the plate to release the tray.

12. (Previously Presented) The liquid dispenser as recited in claim 11 further comprising a spring for urging the at least one bracket against the housing for providing a clamping force on the tray.

13-38. (Canceled)

39. (Currently Amended) A liquid dispenser comprising:

a housing;

a dispensing head comprising a plurality of chambers and associated pistons for withdrawing a measured amount of a liquid from a source and expelling another measured amount of the liquid in a first direction from said plurality of chambers and into the wells of a plate;

apparatus for moving each piston within its associated chamber; and

~~generally horizontally extending~~ slideways disposed on the housing for supporting the dispensing head and extending in a second direction generally perpendicular to the first direction, said dispensing head being unattached to the slideways ~~so as to allow said dispensing head~~ to be slidable ~~in a generally horizontal direction~~ into and out of the housing along the slideways in said second direction.

40. (Previously Presented) The liquid dispenser as recited in claim 3, wherein said housing plate is coupled to said apparatus for moving each piston.

41. (Previously Presented) The liquid dispenser as recited in claim 40, wherein said threaded shafts are connected to said pistons in said dispensing head and wherein said apparatus for moving each piston is coupled to the pistons through said threaded shafts.

42-60. (Canceled)

61. (Currently Amended) A liquid dispenser comprising:

a housing;

a dispensing head comprising a plurality of chambers and associated pistons for withdrawing a measured amount of liquid from a source and expelling another measured amount of liquid;

a tip tray removably mounted with respect to the housing and having a top tray surface and a bottom tray surface, wherein the top tray surface faces said dispensing head; and

a plurality of disposable pipette tips disposed at least partially in said tip tray, each tip being associated with one of the chambers, each tip having a first end with an enlarged opening and a second end having a smaller opening than the opening of the first end, the first end of each tip extending above the top tray surface and being mounted about an opening of an associated chamber to be in direct fluid communication with its associated chamber with no nozzle disposed between the first end of the tip and the chamber opening or extending into the first end of the tip.

62. (Previously Presented) The liquid dispenser as recited in claim 61 further comprising a flexible seal extending around each chamber opening and being engaged by the first end of an associated pipette tip to provide a substantially air- and liquid-tight seal between the first end of each tip and the opening of an associated chamber.

63. (Previously Presented) The liquid dispenser as recited in claim 61 wherein said pipette tips are carried in a tray and wherein the liquid dispenser further comprises a clamp for clamping the tray against a wall of the housing and for clamping the first ends of said pipette tips

in the tray against openings of associated chambers to maintain a substantially air- and liquid-tight seal between the first ends of said tips and the openings of associated chambers.

64. (Previously Presented) The liquid dispenser as recited in claim 63 further comprising apparatus for moving said clamp away from the wall of said housing for releasing said tray and the first ends of said pipette tips.

65. (Previously Presented) The liquid dispenser as recited in claim 63, wherein said clamp comprises slideways for supporting said tray, and wherein said tray may be removed from said clamp by sliding movement along the slideways.

66. (Previously Presented) A liquid dispenser comprising:

- a housing;
- a dispensing head comprising a plurality of chambers and associated pistons for withdrawing a measured amount of liquid from a source and expelling another measured amount of the liquid into the wells of a plate;
- apparatus for moving each piston within its associated chamber;
- slideways disposed on said housing for supporting said dispensing head, said dispensing head being slidable into and out of said housing along said slideways; and
- manually operable apparatus attached to said dispensing head for retaining said dispensing head within said housing, said apparatus for retaining the dispensing head comprising:
 - a plurality of threaded shafts mounted to said dispensing head;
 - a plate disposed within said housing;
 - cutouts on said plate for receiving said threaded shafts; and
 - a knob threadably mounted on each shaft, said knobs being rotatable about said shafts to be screwed into engagement with said plate for securing said dispensing head to said plate.

67. (Previously Presented) The liquid dispenser as recited in claim 66, wherein said housing plate is coupled to said apparatus for moving each piston.

68. (Previously Presented) The liquid dispenser as recited in claim 67, wherein said threaded shafts are connected to said pistons in said dispensing head and wherein said apparatus for moving each piston is coupled to said pistons through said threaded shafts.

69. (Canceled)

70. (Canceled)

71. (Canceled)

72. (Canceled)

Please add the following new claims 73-76:

73. (New) A liquid dispenser comprising:

a housing;

a dispensing head comprising a plurality of chambers and associated pistons for withdrawing a measured amount of liquid from a source and expelling another measured amount of liquid;

a plurality of disposable pipette tips, each tip being associated with one of the chambers, each tip having a first end with an enlarged opening and a second end having a smaller opening than the opening of the first end, the first end of each tip being mounted about an opening of an associated chamber to be in direct fluid communication with its associated chamber with no nozzle disposed between the first end of the tip and the chamber opening or extending into the first end of the tip; and

a flexible seal extending around each chamber opening and being engaged by the first end of an associated pipette tip to provide a substantially air- and liquid-tight seal between the first end of each tip and the opening of an associated chamber.

74. (New) A liquid dispenser comprising:
a housing;
a dispensing head comprising a plurality of chambers and associated pistons for withdrawing a measured amount of liquid from a source and expelling another measured amount of liquid;

a plurality of disposable pipette tips, each tip being associated with one of the chambers, each tip having a first end with an enlarged opening and a second end having a smaller opening than the opening of the first end, the first end of each tip being mounted about an opening of an associated chamber to be in direct fluid communication with its associated chamber with no nozzle disposed between the first end of the tip and the chamber opening or extending into the first end of the tip;

a tray carrying said pipette tips; and

a clamp for clamping said tray against a wall of said housing and for clamping the first ends of said pipette tips in said tray against openings of associated chambers to maintain a substantially air- and liquid-tight seal between the first ends of said tips and the openings of associated chambers.

75. (New) The liquid dispenser as recited in claim 74, further comprising apparatus for moving said clamp away from the wall of said housing for releasing said tray and the first ends of said pipette tips.

76. (New) The liquid dispenser as recited in claim 74, wherein said clamp comprises slideways for supporting said tray, and wherein said tray may be removed from said clamp by sliding movement along said slideways.